DOCUMENT RESUME

ED 190 560 SP 016 516

AUTHOR Gibbs, Graham: And Others
TITLE A Review of the Research of Ference Marton and the Goteborg Group. Report No. 2.
INSTITUTION Open Univ., Walton, Bletchley, Bucks (England). Inst. of Educational Technology.
NOTE 29p.: For related documents, see SP 016 517 and SP 016 521.

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Academic Achievement: *Cognitive Processes: *Concept Formation: Evaluation Methods: *Learning Motivation: Outcomes of Education: *Student Attitudes: Teacher Influence: Teaching Methods

ABSTRACT

This paper reviews the research of Ference Marton and his group of researchers at Goteborg University. It describes and explains research on: 1) what students learn, 2) how students approach learning, 3) the relationship between approach and learning outcome, 4) student perceptions of learning, and 5) the possibility of manipulating student approaches to learning to influence learning outcomes. (Author/CJ)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

Institute of Educational Technology
The Open University
Walton Hall
Milton Keynes MK7 6AA

Telephone (0908) 653546

STUDY
METHODS
GROUP
Report No. 2

ED190560

A REVIEW OF THE RESEARCH OF FERENCE MARTON
AND THE GÖTEBORG GROUP

Graham Gibbs
Alistair Morgan
Liz Taylor

Abstract

This paper reviews the research of Ference Marton and his group of researchers at Göteborg University. It describes and explains research into: what students learn; how students approach learning; what the relationship is between approach and learning outcome; what students understand learning to consist of; and whether it is possible to manipulate students' approach in order to influence learning outcome. It highlights the importance of the perspective this research takes and examines the implications of such a perspective for research in the Open University.

U S DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
The Open University
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

SP 016 516

SMG2 Institutional Research Methodology - Study Habits.

Introduction

What distinguishes the work from the Goteborg Group is not the subject matter of their research, but the perspective from which they view the subject matter. As a consequence they have been able to describe learning in ways which have given fresh insights into what learning consists of. Rather than beginning by describing what this perspective is, we shall first describe some of the things which they have seen from this perspective. As what they have seen looks rather different than what one sees from conventional quantitative descriptions it will hopefully become clearer that it is their perspective which is crucial. We'll then go on and examine this perspective and what implications all this has for research and development in the Open University.

We will not be giving an historical account of the development of their ideas, which might seem rather complex, but instead telling a story by using studies and ideas in an order which fits into our story. We hope this works well without doing an injustice to the ideas.

The paper is divided into the following sections:

		Page
1)	The content of learning - which describes studies of what it is which students understand and have learnt.	2
2)	Students' approach to learning - which describes studies of how students go about learning.	5
3)	Approach and outcome - which describes studies of the relationship between students' approach to learning and the outcome of learning.	8
4)	Students' conception of learning - which describes studies of students' understanding of what learning consists of.	10
5)	Influencing the outcome of learning - which describes studies of attempts to manipulate the approach students take to, and so the outcome of, learning.	14
6)	The Goteborg research perspective and its implications for the Open University.	18

AUG 2 5 1980

1. The content of learning

Very little research has ever attempted to describe what students understand. Instead it tends to describe how much has been learned. Several of the most exciting Goteborg studies have examined in detail what it is that people understand about particular concepts. For example, they have looked at how the concept of price is understood.

In one study individual schoolchildren were asked, in one-to-one interviews:

"Why does a bun cost about one crown?"

Examining the answers the schoolchildren gave, they found four kinds of answers which involved the following four kinds of conception of price:

A. Price is determined by the relationship between supply and demand for commodities

B. Price is determined by the value of a commodity or the accumulated value of its constituents

C. Price is determined by other properties of commodities than value such as taste, shape, size etc.

D. Ignorant answers (e.g. "I like buns")

As Dahlgren points out (Dahlgren, 1979b) these categories of answers are qualitatively different. "The difference between A and B can be described in terms of whether the price is conceptualised in system oriented terms (which is more dynamic and abstract) or whether it is regarded as a property of a commodity (which is both more static and concrete)." The distribution of answers amongst these categories for children at different school grades is given in Table 1.

Table 1. Distribution of answers to "Why does a bun cost about one crown?"

Category	Nursery	2nd	4th	6th
A	0	0	1	1
B	3	18	25	27
C	8	6	3	1
D	19	6	3	1

As can be seen, what children understood varied with their school grade. It did not only vary with their school grade, however, it varied according to the way the question was asked. The same children were also asked:

"Why does a bicycle cost more than a ball?"

and "Why does a diamond ring cost more than a bicycle?"

As you might have guessed, the children's 'best' answer to these questions was considerably better than that for the first question (see Table 2, and compare it with Table 1).

Table 2. Distribution of best answers about the price concept.

Category	School Grade			
	Nursery	2nd	4th	6th
A	0	6	14	17
B	24	23	15	13
C	5	1	1	0
D	1	0	0	0

Does this mean that by clever questioning, it was possible to teach the children a more sophisticated conception of price? No, it does not. When they had finished asking these other questions they again asked the children "Why does a bun cost about one crown?" The children's answers were very much like their original answers to this question (with the exception of a large increase in ignorant answers for 2nd grade children). In other words what the children understood depended on the context (or question).

This variation in children's conceptions across different contexts or tasks is becoming recognised by psychologists as the norm rather than the exception (e.g. Donaldson, 1978). This is contrary to Piagetion views that conceptions are stable across all contexts, within a particular developmental stage. This emphasis on the context dependency of learning is heavily emphasised throughout the Goteborg papers (cf. Marton, 1978, Svensson, 1979). It has some crucial implications for the next study we shall summarise.

Dahlgren (1978a, 1978c, 1979a) has also examined students' understanding of the concept of price in the context of a University Economics course. This was a one term economics course for freshmen. At the start of the course, the students

were asked, in depth interviews ten everyday questions about economics which could be understood by people in the street (e.g. about cost, money, inflation). At the end of the course, fifteen out of eighteen students accumulated enough marks to pass their exam, but what did they understand about economics concepts? Before the course, of thirteen students, six gave answers revealing the type A conception of price described above (price as a relationship between supply and demand) and seven gave answers revealing the type B conception (price as the value of the commodity). After the course, only four gave type A answers. Three of the six who initially gave type A answers ended up giving type B answers. It should be remembered that the nursery school children often held this type B conception! This is hardly a very impressive picture of the impact of the economics course on the understanding of economics concepts achieved by the students! Also, it is a completely different picture than that given by a quantitative evaluation. For one exam question concerned with the relationship between production resources spent and production outcome, 89% gave quantitatively acceptable answers. However only 26-47% gave qualitatively acceptable answers to direct interview questions concerning the concepts involved in this relationship (Dahlgren, 1978c). While these are two quantitative measures I am comparing here, they are of a very different nature. The conventional quantitative measure is of the proportion of students who exceed a quantitative criteria and pass the question. Students can exceed this criteria by accumulating enough marks, regardless of the quality of their understanding. The second quantitative measure is of the proportion of students who exceed a qualitative criteria. The main difference between these two measures is highlighted by the qualitative changes which took place in the students' answers. The main differences between students' verbal answers to the ten everyday economics questions before and after the course was in terms of the use of new economics terminology to describe the same conception. The use of this terminology was sufficient to accumulate sufficient marks to exceed quantitative criteria. By looking at the content of learning, in the students own terms, a strikingly different impression of the effects of the economics course had been gained.

One additional aspect of such an analysis of the content of learning has been descriptions of the fate over time of what is learnt. Ever since

Ebbinghaus (1885) it has been assumed that what is learned "disappears" rather rapidly over time unless drastic steps are taken to prevent this. This conception of forgetting is a consequence of a quantitative measure of learning. In numerous studies at Göteborg the long-term consequences of studying a text have been examined in terms of the content (rather than the quantity) of what is learnt. This is rather in the tradition of Bartlett (1932) (cf. Dahlgren, 1975; Marton and Säljo, 1976a, 1976b; Marton and Wenestam, 1979). The main characteristics of change over time have been found to be (i) an erosion of the quality of students' conceptions and (ii) a relative stability, e.g. "...the main feature of change in the retention of the outcome of non-verbatim learning is not disappearance but distortion"; and "...the change, at group level, over a period of about 45 days is almost negligable...", "... we can note a remarkable stability in the answers. Actually there is a considerable variation in the words used by the subjects to express their answers on the two occasions but the basic structure of the answer given on the immediate measurement is in almost 50 per cent of the cases.....repeated after a 45 day interval." (Dahlgren, 1975, p.111).

2. Students' approach to learning

Why were the learning outcomes in Dahlgren's studies so dismal? What variation in learning process is there that corresponds to the variation in learning outcome observed? In both experimental studies and in the context of everyday studying, the ways students experience studying has been examined by the Göteborg group. In experimental studies (e.g. Marton and Säljö, 1976b) students have been asked to introspect about their experience of reading a text. It has emerged that students' descriptions are of two rather different sorts. In one sort, students described their approach in the following way:

> "Well, I just concentrated on trying to remember as much as possible".
>
> "I remembered....but, I'd sort of memorised everything I'd read....no, not everything, but more or less".
>
> "It would have been more interesting if I'd known that I wasn't going to be tested on it afterwards, 'cos in that case I'd've more, you know, thought about what it said instead of all the time trying to think now I must remember this and now I must remember that."

In the other sort of description, students said:

> "..... I tried to look for...you know, the principal ideas..."
>
> "....and what you think about then, well it's you know, what was the point of the article, you know...."
>
> "No, I...tried to think what it was all about....."
>
> "....I thought about how he had built up the whole thing."

This sort of difference of approach they have repeatedly encountered in different studies, and it has also been clearly evident in two studies in British Universities (Laurillard, 1979, at Surrey University, and Ramsden, 1979, at Lancaster University). Preliminary studies we have made with Foundation level social science and technology students strongly suggest this variation exists in the experience of Open University students.

It is important to note that this is not simply a quantitative difference in a variable such as motivation or attention. It is a qualitative difference of level of approach. In the first sort of description students have the discourse itself, the sign, as a focus of attention, and in the second sort of description students were concerned with what the discourse was about - what was signified. These two categories of approach have been labelled "surface approach" and "deep approach" respectively (see Footnote 1).

But to what extent are these descriptions of level of approach a fixed characteristic of the students? It has been a common practice in quantitative studies of the approaches students take to their studies (for example, Witkin's studies of field dependence/independence, e.g. Witkin et al. 1977) to look for consistencies amongst students' behaviour and to attribute these to some notion of cognitive style or learning style which is relatively unchanging from situation to situation, rather like a personality characteristic. Is the surface/deep distinction of this nature?

Well, some evidence of consistency certainly exists. For example Svensson (1977) found that 21 out of the 30 students in his study took the same approach in his experimental studies as they did in their normal studies. This sort of evidence has encouraged the Lancaster University research group to develop a questionnaire which is intended to identify 'surface processors' and 'deep processors'. However if one looks at learning in specific contexts, and

asks students, one gets a rather different picture of the nature of the surface/deep distinction.

Firstly, Diana Laurillard, at Surrey University, has shown that students will take a surface or deep approach to a task depending on the nature of the task. She required students to teach back to her material which they were studying on their science course. The variation in students' approaches become apparent when the specific content and context of the learning was examined (Laurillard, 1978).

Secondly, Roger Säljö (1979c) introduced the notions of surface and deep approach to 72 subjects in a paper about this in an experiment:

> "..... a clear majority of subjects participating in this study recognise the dichotomy between a deep and surface approach and they can furthermore relate their own methods and procedures of learning to this perspective. A surprising result, however, is the finding that very few describe themselves as belonging exclusively to either of these categories. Rather, the general attitude among 61 out of the 72 subjects, who described their own learning in the perspective outlined in the text used as learning material, is that they consider both of these approaches to be applicable to their own learning.... the subjects perceive their approach to learning as being contextually dependent."

For these students we would need to look at the way specific learning contexts are conceptualised and experienced by the students in order to understand why a surface approach is sometimes adopted.

However, there were also a number of students in Säljö's study who:

> "....adopt a surface approach to learning because they have a conception which does not make it possible for them to go about learning in any other way. Their inability to understand the distinction between a deep and a surface approach may in fact be a sign of just this."

So while for some there was an awareness of contextual influences, and even the possibility of choice about which approach to learning to adopt, for others:

> "There may not be any room for such contextual influences simply because learning is held to have one fairly obvious meaning which does not differ from one situation to another."

For these students we would need to look at their conception of learning in order to understand why a surface approach is always adopted.

The Göteborg group have looked at both the characteristics of learning contexts

as experienced by students, and the conceptions of learning held by students, in relation to the approach students adopt to their learning.

3. Approach and Outcome

The Göteborg group have clearly demonstrated a relationship between the approach a student takes to a learning task and the learning outcome. Such relationships have been demonstrated in many studies of the effects of so-called "mathemagenic" activities, but here the relationship is between students' descriptions of their own approach on the one hand and the quality of the content of their learning on the other. For example, in one study (Marton and Säljö, 1976a) students were asked to read an article concerning curriculum reform in the Swedish Universities. They were then asked "Try to summarise the article in one or two sentences. What is the author trying to say, in other words?" The author argued that a blanket approach to reform aimed at raising pass rates was misguided, and that selective measures should be taken which concentrated on particular categories of students. It was found that students' answers fell into four categories:

A. Selective measures were to be taken, i.e. only for particular categories of students.

B. Different measures were to be taken for different groups.

C. Measures were to be taken.

D. There are differences between groups.

These students were also asked to introspect concerning the way they had gone about reading the article, and their comments categorised in terms of the distinction described in Section 2 above, i.e. surface/deep approach. The relationship between the approach students took and what they learned can be seen in Table 3.

Table 3. Relationship between approach and outcome

		Level of outcome			
		A	B	C	D
Level of approach	Surface	0	1	8	5
	Not clear	0	6	0	1
	Deep	5	4	0	0

It is clear that the approach students took to reading was very important. None of the students who described their approach in terms categorised as a surface level approach completely understood the author's argument, while none of the students who took a deep approach failed to gain a good understanding.

Further work at Göteborg by Lennert Svensson (Svensson, 1976, 1977) has shown that this relationship exists in everyday studies as well as in experiments. In an experiment he found students adopted one of two different approaches. Students who adopted what he calls an 'atomistic' approach focussed on specific comparisons in a text, focussed on the parts in sequence, on memorising details, and lacked an orientation towards the message as a whole. In contrast, students who adopted what he calls a 'holistic' approach focussed on understanding the overall meaning of the text, searched for the author's intention etc. (These categories are clearly similar to the surface/deep distinction, as well as distinctions drawn by Bruner, and by Pask, on the basis of rather different evidence.) Students were categorised according to which approach they described themselves as adopting, and also according to whether their recall data from students study of two texts, a clear relationship between students' approach and their learning outcome was again found (see Table 4).

Table 4. Relationship between approach and outcome for delayed recall of two texts

	Outcome	
Approach	Conclusion	No conclusion
Holistic	22	0
Atomistic	12	25

(abridged from Table 1, Svensson 1977)

These students were closely followed over a year of their normal studies on a course. Their approach to their everyday studies was investigated, and it was found that 23 out of 30 studied in the same way as in the experiment. Of these 23, 10 were categorised as adopting a holistic approach in both experimental and normal studies and 13 were categorised as adopting an atomistic approach in both studies. Of the 10 adopting a holistic approach, 9 passed the course. Of the 13 adopting an atomistic approach, only 3 passed the course. Again, despite the small numbers in the study (enforced by the methodology employed) there were very clear cut results.

Svensson also examined the relationship between the numbers of hours students spent per week, whether they revised for the exam, and what sort of study techniques they used. By making four dichotomous decisions about each student (holist/atomist; greater or less than three hours study a week; revised/didn't revise; elaborated or restricted study technique) he was able to correctly predict the exam outcome of 29 of the 30 students in the study. However, unlike those advocating a "study skills" explanation of such findings, he understands the relative diligence and study techniques of students in relation to their approach, not as isolated, technical skills. Adopting an atomistic approach brings with it problems - study becomes boring and revision is very hard to undertake in a productive way. And in fact for those adopting an atomistic approach, time committment tailed off as the course progressed. Study techniques are thus seen as having functional relationships with students approach. There is further support for these conclusions in similar studies elsewhere (e.g. Goldman, 1972; Biggs, 1976).

> "....to sum up it would appear that a decisive factor in non-verbatim learning, both in experimental settings and in everyday work, is the learner's approach to learning".
>
> (Marton, 1975a)

If this is so, a crucial issue which arises is whether one can <u>influence</u> students' approach to learning, or conception of the learning task, in order to improve learning outcomes. A number of studies have examined this issue, and these studies are of particular interest as they have something to say about the Open University's use of objectives, in-text questions and S.A.Qs as mathemagenic devices. Is the (almost universal) use of these devices likely to be associated in any way with the approach students adopt to studying course units? This question will be tackled in Section 5 below.

4. <u>Students' conception of learning</u>

Säljö (1978) has suggested that:

> "If one were to ask a number of people, educational researchers as well as laymen, to set up an experiment which would decide who of a given group of persons is the best learner, the chances are probably quite large that this experiment would be designed to tell us who could learn most 'units of information' in a given period of time or who could learn a given amount of material most quickly. What I am trying to say is that my guess is that to most people the statement 'being better at

> learning' has a purely quantitative meaning and consequently the decision as to who of a number of persons is the best learner is seen as a question of 'how much' and/or 'how fast'. Similarly, should one agree to the initial statement about the relationship between practice and performance within this perspective on learning, it would imply that practice on one way or another would imply an increase in the capacity to absorb information.
>
> This perspective on learning which seems natural and self-evident to many is, however, only a perspective, or rather, one perspective. It is a perspective which is taken for granted in most studies on learning, and empirical research which is carried out within this main-stream frame-work never has to include any justification of e.g. why differences between people with respect to learning are described the way they are, i.e. in terms of 'more' or 'less'. Nevertheless, I should like to argue that there are alternative ways of conceptualizing the phenomenon of learning leading to different approaches in empirical research."

When he asked 90 people (Säljö, 1978, 1979b) of as wide a variety as possible, about their conceptions of learning, he discovered that for some the phenomenon of learning in itself had become an object of reflection, whereas for others it had not. For some, learning was something which could be explicitly talked about, discussed, consciously planned, and analysed. For others, it was taken for granted. He found that students take three main 'steps' in the development of their reflection about learning. They make the following three distinctions:

> "1. The first of these distinctions concern subjects reporting themselves as becoming aware of the influence of the context in learning about what you should learn and how you should set about it. Thus, subjects report that at some time or another they started to try to adapt their learning to various kinds of demands (e.g. teachers, tests, etc.). This is of course the perspective described by, for instance Snyder (1971) and Miller and Parlett (1974) and, to follow the terminology suggested by the last two researchers, this distinction implies that subjects somehow become 'cue-conscious', i.e. they become aware of the implicit rules governing learning in a school context. Whether or not subjects decide to adapt their learning to these rules is a different problem. The main thing is, however, that they become aware of such demands.
>
> 2. The two remaining distinctions are more closely linked to the activity of learning as such. The first of these refers to a distinction between learning 'for life' versus learning in school. Quite a large proportion of the subjects make this distinction, the essential nature of which seems to be that learning in school is perceived of as an activity which, to a too large extent, has become stereotyped and routine, guided only by the needs and principles of schools themselves. Learning in school is thus held to be a particular activity whose prime feature is articiciality in the sense that it is not perceived of as being organically related to anything outside the school situation itself. Many of the subjects who analyse learning in school on the basis of this distinction are consequently very negative and critical. However, for our present purposes it may suffice to say that the discovery of this problematic nature of learning in educational contexts seem to many to serve as a step through which learning becomes thematized.

> 1. Perhaps the most interesting distinction in the present data concerns the fact that at certain points subjects report themselves as having started to think about the nature of what is learned or, following the terminology of Colaizzi (1973), the nature of the learned content. This distinction is introduced by the subjects themselves as that between either learning and real learning or, even more commonly, as that between learning and understanding.
>
> Real learning or understanding is, in this case, contrasted with rote learning and its main feature is considered to be that it in some way involves the abstraction of meaning (cf. Colaizzi, 1973) from learning materials rather than a mere reproduction of them. In a sense, the nature of what is learned is perceived of to be more complex and to have a more holistic nature; it is a perspective, a point of view, an interpretation, a principle, etc., rather than the plain 'facts' which subjects previously report themselves as having perceived of as what is to be learned. These facts are now seen instead as subordinated to what should really be learned, i.e. the general meaning."

Säljö (1979a) has also studied people's conceptions of learning directly by simply asking them "What do you actually mean by learning?" Students' answers revealed five rather different conceptions: (these are extracts from p.12-19).

> "Conception 1: Learning as the increase of knowledge
>
> The main feature of this first category is its vagueness in the sense that what is given in the answers is merely a set of synonyms for the word learning.
>
> "S: ...it's to increase your knowledge....
>
> E: ...hum ... could you say something further?
>
> S: ...well, you kind of start with a small bag and there is not much in it, but then the longer you live, the more you fill it up..."
>
> "Conception 2: Learning as memorizing
>
> .... The meaning of learning is to transfer units of information or pieces of knowledge, or what is commonly referred to simply as facts, from an external source, such as a teacher or a book, into the head.
>
> "S: To learn...well as I understand the word ... sort of to listen and to get it inside ... acquire knowledge kind of ... yes, quite simply to learn it ... yes sort of to learn, to get things in one's head so they stay there."
>
> "Conception 3: Learning as the acquisition of facts, procedures, etc., which can be retained and/or utilised in practice.
>
> Compared to the previous conceptions ... some facts, principles etc. are considered to be practically useful and/or possible to remember for a long period of time, and as a consequence of this they should be learned.
>
> "S: Yes, to learn so that you know it and so that you can make use of it. It shouldn't be just learning something which disappears immediately after you've learned it, but you should be able to make use of it even after a while...."

"Conception 4: Learning as the abstraction of meaning

Compared to the previous two categories the distinctive characteristic of this conception is that the nature of what is learned is changed. Learning is no longer conceived of as an activity of reproducing, but instead as a process of abstracting meaning from what you read and hear.

> "S: For me, personally, learning does not mean that you should learn all those petty details, but instead it means learning about a course of events and how things have developed, and reasoning within my subject but it does not mean sitting and memorizing trifles such as dates and such things as people do...."

....the reproductive nature of learning is replaced by a conception which emphasises that learning is a constructive activity. The learning material is not seen as containing ready-made knowledge to be memorized, but rather it provides the raw material or starting-point for learning.

"Conception 5: Learning as an interpretive process aimed at the understanding of reality.

This conception of learning is very similar to the previous one in the sense that the picture which is supplied in the descriptions concerning the nature of what is learning is very much the same. The reason for making a further distinction is that some subjects emphasise that an essential element of learning is that what you learn should help you interpret the reality in which you live.

> "S: Yes, learning that means to get the sort of insight into your subject so that you can use it in your everyday life."

> "S: In some way I think I've found out that you learn things twice somehow. The first time could have been at school really, the second time is the connection, I mean it becomes conscious in some way ..... I mean it should be related to some kind of practice. That's when you have learnt it, I think, terribly much. Then you can live....I mean you can sort of <u>be</u> your knowledge in some way. Then, then the really important thing has happened....."

Säljö highlights fundamental differences underlying these conceptions.

> "A prominent feature of especially the second conception described above is the idea that knowledge is external to individuals and that the process of learning essentially means a more or less verbatim item-by-item transfer of knowledge from an external source, into the heads of the learners where it is filed. In contrast the essence of conceptions 4 and 5 seems to lie very much in an emphasis on the assumption that knowledge is construed by individuals as a result of an active effort on the part of the learner to abstract meaning from a discourse and also to relate this meaning to an outside reality."

It also seems clear that the qualitative differences between conceptions 2 and 3 on the one hand, and 4 and 5 on the other, are very similar to the distinction between surface and deep level approaches to learning identified in experimental studies. It seems likely that the approach people adopt to learning tasks has to do with their conception of what knowledge and learning

is (a similar point to that emphasised by Perry (1970).

Those students Säljö identified (see Section 2 above, Säljö 1979c) who held learning "to have one fairly obvious meaning which does not differ from one situation to another" are likely (i) not to have yet made the distinctions outlined above and (ii) to hold a conception of learning nearer to conception 1 than to conception 5. Referring back to the economics study described in Section 1 above, many of the students whose understanding of economics concepts did not change over the course are likely to have adopted a surface approach to studying. That some of these students may have done this may be understood in terms of the conceptions of learning held by these students rather than in terms of either psychological characteristics of these students (such as "intelligence") or characteristics of the course (such as "difficulty").

5. Influencing the outcome of learning

Some of the students in the economics study described in Section 1 will however probably have adopted a surface approach even though they had a more sophisticated conception of learning. Such students may have been oriented to take a surface approach by characteristics of the learning task (such as its perceived sheer size or the perceived demands of the assessment system). The Göteborg group have undertaken a number of studies which have examined attempts to orient students to take a particular approach to their learning in order to manipulate the quality of the learning outcome.

Before looking in detail at those studies we will raise two important points.

1) The Göteborg group have distinguished between two sorts of variation in students' approach to learning tasks. Firstly, there is a horizontal dimension which refers to which things are attended to. Some sorts of mathemagenic devices may orient learners towards particular content. Secondly, there is a vertical dimension which refers to the level of approach - not what is attended to but what quality of attention is involved. Here they are referring, of course, to their distinction between surface and deep level approaches.

2) What students do in experimental studies may not be good indications of what they do in their everyday studies. When Säljö (1979c) asked students to talk about the way they went about an experimental task in terms of deep and surface approaches, he found that students spontaneously told him that they had tackled the experimental task in an atypical way: "Even subjects who report themselves as having once and for all decided never to use a memorizing strategy when learning claim that it is very easy to fall back into this behaviour in an experimental situation". One reason for this was a "...strong inclination on the part of most subjects to perform well i.e. to be 'good' subjects and the uncertainty as to what the experiment was all about and, consequently, what kinds of questions they would be required to go through after the learning phase" (p.21-22) Säljö concluded (p.21) that:

> "this would seem to imply that the demand characteristics of this experimental study of learning (and no doubt, many others too) tended to lead to an approach to learning on the part of many of the participants which was perceived by them as being atypical of their normal way of setting about learning. In other words, subjects claim that in an experimental situation they perceive themselves as proceeding in accordance with a surface approach even though they do not normally consider themselves as doing this, not even in the school context. This is, of course, a prime example of the difficulty of experimenting with human subjects who are never neutral to an experimental situation, but instead respond in various ways to the demands they perceive."

This is a profoundly important point if we are to interpret the mass of research on methemagenic devices which is almost exclusively done in artificial experimental contexts. It would suggest that variation in learning approaches and outcomes would tend to be only in a horizontal dimension i.e. <u>what</u> or <u>how much</u> is attended to, <u>what</u> or <u>how much</u> is memorized. This is, in fact, exactly what Dahlgren (1975) concluded from reviewing literature or mathemagenic devices:

> "The impression gained as a whole is that the controlling factors derived from the mathemagenic hypothesis probably do not have the ability to create a qualitatively new pattern of learning activities. Rather, the effects on the learning result are to be found in the horizontal variation of the level of attention created by the questions. In other words, these lead to an alternative distribution of learning activities in accordance with the distribution dictated by the demands of the situation as it is expressed in the questions."

This suggests that normal forms of content-oriented guidance in the form of in-text questions <u>cannot</u> affect the vertical level of the approach students take.

Dahlgren's study (1975) examined the quality of learning outcome of

experimental and control subjects who read the first two chapters of Samuelson's text book "Economics". The experiment subject had in-text questions referring to specific parts of the text, inserted. All subjects were asked the same questions about the passage, in depth interviews. We will illustrate the outcome of a sort of this study with students' answers to the first question concerning Samuelson's definition of economics. In the usual way students' answers were analysed and five categories emerged:

A: "Economics is the study of the allocation of
   a) productive resources and the distribution of
   b) commodities."

B: "...only contain the resource allocation aspect of the study of Economics."

C: "...only deal with the distribution of production output."

D: "...do not at all mention the study of distribution/allocation of resources or commodities..."

O: "...declared that they did not remember anything at all...."

The experimental and control groups answers fell into these categories in the following way:

Table 5. Learning outcome as a function of experimental treatment

		Experimental Group	Control Group
Qualitative category of answer	A	4	11
	B	6	2
	C	3	4
	D	3	0
	O	1	2
		19	19

(abridged from Table 19, p.114)

As can be seen the experimental manipulation resulted in qualitatively poorer answers. This pattern was evident, to a small extent, in the overall analysis of all the questions asked in Chapter 1 (p.114). This therefore confirms Dahlgren's conclusions from research on mathemagenic activities.

However, it seems to us that the nature of the questions asked in Dahlgren's

experimental manipulation may not have involved an explicit orientation to deep level processing. What happens when such an explicit orientation is used as an experimental manipulation? In other words can content oriented guidance change students conception of the learning task and result in a deep level approach and a fuller understanding of the text?

Marton (1975b) carried out a study in which the experimental manipulation consisted of the insertion into a text of content neutral questions after each section (e.g. "Can you summarise the content of each subsection in one or two sentences?") The control subjects were allowed to read as they wished. Two distinctions were used in analysing students' answers to questions after their reading: (i) between adequate and inadequate descriptions of the topic (ii) between merely mentioning topics and describing the content of the topic.

The control group gave twice as many adequate descriptions as the experimental group and merely mentioning was four times as frequent in the experimental group. These dramatic differences were even evident two months later. Marton conclused:

> "Instead of adopting a deep level processing, the aim of the experimental treatment, the subjects seem to have become fixated with the explicit requirements of the questions...the subjects defined the task in a far narrower way than was intended by the experimenter" (Marton 1975a)

and

> "The questions via which the requirements are defined are only signs of or means to, the real intended requirements, i.e. the acquisition of knowledge in the sense of competence. There are no longer limited sets of questions however, which define competence. When subjects interpret the signs of intended requirements in such a way that they are identical to the intended requirements, they technify and narrow the task and make it trivial." (Marton, 1975a).

This phenomenon of 'technified' approach is evident again in a later study (Marton and Säljö, 1976b)

While it is as easy as falling off a log to induce surface level processing, attempts to induce deep level processing may interfere with or 'technify' student learning.

On the basis of these Göteborg results, and his studies of the effects of study skill activities on reading, Edfeldt (1976) concluded that:

> ".....what is central in the reading process is the reader's uninterrupted contact with the subject matter in the text. A direct result of this is that every form of interruption of the contact between the reader and the text's subject-matter leads to a deterioration of the reader's performance. Such interruptions can be....of such apparently high content promoting value as, for example, those which occur in connection with the most refined mathemagenic activities. They can...have the form of direct questions or structuring sentences which have been slipped into the running texts. A common feature of all these different phonomena is that they do not in any way promote any form of contact between the text's subject-matter and the reader on the reader's terms. This means, of course, that the only aid that is adequate for a better understanding of the text comes from the readers own frame of reference. Everything that is brought in from outside, e.g. pure technical advice or structuring measures affecting the content with an assumed basis in the author's frame of reference or an actual basis in someone else's frame of reference, puts a stop to the spontaneous and necessary interplay between the reader and the text's subject-matter."

6. The Göteborg research perspective and its implications for the Open University

We hope it has become clear from the above selective review that the research of the Göteborg group is consistent with a particular philosophical and theoretical perspective. The aim of this section is to outline this perspective on the basis of, primarily, two important 'position' papers, (Marton, 1978; Marton and Svensson, 1979). These are the two papers to read, if you read nothing else.

The perspective of the Göteborg group is a reaction to the naturalism of traditional research on learning. Their aim is to describe "the world as perceived" - a phenomenological aim. Marton contrasts this with the aim of traditional research - to describe "the world as it is". He describes the 1st order perspective as noumenal while the 2nd is perspective, adopted by Marton, as phenomenal.

Marton argues that these two perspectives are autonomous and complementary. What can be seen from one perspective cannot be seen from the other. He therefore believes that there is a clear relationship between what we are looking for in research and the position, or perspective, from which we do the looking.

At a superficial level this distinction has already been recognised within IET in that the Tuition and Counselling Research Group had been implicitly

assumed to be gaining its "student-centred" views in a rather different way than the Survey Research Department. Marton clarifies, extends and makes explicit this distinction.

The second order perspective has been adopted by numerous studies on student learning in recent years and Marton distinguishes three areas with which this perspective is concerned: the content, context and awareness of learning.

In the 2nd order perspective:

> "Firstly, learning always occurs naturally in a context...the context of learning is (thus) not described independently of the learners but rather through their eyes. The description thus refers to the way in which students relate themselves to the situation. ....it always has a content as well. ...we consider the finding and describing of conceptions (meanings) of fundamental aspects of various learning materials to be one of the main tasks of research into student learning.
>
> Lastly, not only is there a consciousness of the content in the learner, but there is a consciousness of his being conscious of it as well. .....the learner's experience of the act of learning."
>
> (Marton and Svennson, 1979)

This perspective therefore entails a concentration on one or more of these aspects of the learners experience and that experience is studied from the point of view of the learner.

This distinction of <u>perspective</u> is the most crucial characteristic of the Göteborg work and, in our view, it subsumes the other distinctions they have made between:

<u>Qualitative</u>	and	<u>Quantitative</u>	<u>Description</u>
<u>Contextualised</u>	and	<u>Generalised</u>	<u>Conceptualisation</u>
<u>Internal</u>	and	<u>External</u>	<u>Relations</u>
<u>Understanding</u>	and	Explanation	forms of <u>Comprehension</u>
<u>Emancipatory</u>	and	<u>Technical</u>	Use

(abridged from Table 1, Marton and Svennson 1979)

We will very briefly elaborate on these distinctions.

The <u>inevitable</u> consequence of taking a 2nd order perspective is a change from mainly quantitative to mainly qualitative descriptions. This is because:

> "the learner experiences content, as well as process more as a 'what' or 'how' than 'how much'."

The 'how much' question relates exclusively to those situations where that which is to be studied is already defined. In order to measure something you must know what 'it' is. But within the 2nd order perspective what 'it' is, is the focus of attention. Within the 1st order perspective this is taken for granted. For the Goteborg group results are in terms of descriptions of different conceptions of aspects of reality and these inevitably entail differences in terms of kind.

In the 1st order perspective we:

> ".....observe the learner and describe him as we see him and we observe the learner's world and describe it as we see it. We frequently relate our description of the student to our description of his world and generally do this within an explanatory framework."

An example of this 1st order perspective is Jack Field's recent survey-based study on the effectiveness of various advisory and preparatory 'treatments' for new Undergraduates (Field, 1979). In this report he related mean student ratings of various 'treatments' on rating scales devised by himself, to mean grades aggregated across widely different assessment procedures, devised by a large number of others. Using correlational procedures, he then suggests causal relationships between these external observations to explain the value of various forms of preparation and advice to students. He is cautious enough to say that his 'explanations' are only hypotheses. A problem we have in understanding how our students become effective learners is that any number of hypotheses can be proposed which 'fit' such correlational data. Interestingly, many such hypotheses appeal to descriptions of students' experience of preparation and of the Open University. But these are purely hypothetical descriptions of student experience. One needs to adopt a 2nd order perspective in order to see this experience and to describe it rather than simply to imagine what it might be.

The relations which are derived from a 2nd order perspective are of a different form to the external relations described by Jack Field. When one is looking from the learner's point of view all relations are internal: the learner's: "experience of the world is a relation between him and his world". The emphasis on the context of learning and on the internal relations of the learner's experience of context makes the description the research provides

contextual in nature, as opposed to generalised. The aim of the perspective is:

> "To find and systematise forms of thought in terms of which people interpret aspects of reality".

For example the descriptions "deep" and "surface processing" are considered to be one such 'form of thought' in terms of which learners interpret how they approach learning tasks. These descriptions are highly contextualised and refer to specific statements students made about their experiences of specific contexts. The forms of thought may be fairly generally observable from the 2nd order perspective (in fact they have been observed in sufficiently varying contexts to suggest that this is so) but this generality is open to research, it is not taken for granted. And such descriptions can only be derived in the first place from the analysis of people's experience of specific contexts.

For us, perhaps the most important distinction, other than that of perspective, is that between different uses to which research is put. There has been a long, if often implicit debate within the Institute of Educational Technology concerning the way in which research should 'inform' course design. In one camp are those who aim to provide algorithms and procedures for faculty 'operatives' to use. The relation between theory and practice is seen to be of a 'technical' nature and theory is assumed to be of a sufficiently developed form that the algorithms lead to the proper actions. Some of the Student Assessment Research Group's manuals on writing computer marked assignments seem to be firmly in this camp. Stratton (1979) for example, offers an 'Algorithm for Item Polishing' (p.6).

> "The rival view implies that the choice of action in every concrete situation must be based on profound knowledge of and familiarity with the specific circumstances. The choice of action has to be made by those who run the risks and who know the conditions: by the participant's themselves. Strategic choices can thus never be derived from any general formulations. The relation between theory and practice should therefore be of an emancipatory character. The theory should raise the level of awareness in the participants and in this way indirectly increase the likelihood of better, more considered, and open decisions."
>
> (Marton and Svensson, 1979a)

This distinction can be clearly seen both in attempts to help students and attempts to help teachers. As has been argued elsewhere (e.g. Gibbs 1977a, Edfeldt, 1976) technical or "study skill" approaches to improving student

learning (epitomised by the Algorithm for flexible reading in the Open University's Preparing to Study manual) are usually ineffective and sometimes harmful. We have, very successfully, developed and introduced 'emancipatory' student-centred, approaches to learning to learn (e.g. Gibbs, 1977b, Hounsell, 1979).

An example of an emancipatory use of theory is Andrew Northedge's recent paper to the D102 course team (Northedge, 1979). In this he described a constructivist theory of learning and gave specific contextual examples of where D101 has operated in ways at odds with this theory and the consequences of this for student experience. The context dependency of this paper and its emphasis on teaching as an imaginative art rather than as a prescriptive science has put D102 course writers in a very different and more flexible position with regard to educational theory than they might have been.

Marton sees his research as providing teachers with descriptions of how students conceptualise the subject matter and experience learning - not as providing rules for how to teach. In fact he sees teacher competence as determined by the extent to which teachers understand the way their students think about the subject matter (see footnote 2). The relative ineffectiveness of mathemagenic devices in his research also supports this position.

Finally, being a research group, we should like to make a further point about the implications of this research perspective for the forms of evaluation which are usually undertaken by IET to test the effectiveness of its favourite teaching devices. We should like you to imagine that the efficiency of the in-text questions (ITQs) in a particular Unit is being examined. Two sorts of answers are normally given in this sort of situation: 1) The value of ITQs is 'explained' by the behavioural (or experimental evidence of the effectiveness of such devices in general. These theories are, without exception, 1st order theories. The experimental evidence is, without exception, quantitative. Dahlgren (1975) reviews this literature and goes to some lengths to demonstrate its limited value. 2) The value of ITQs is demonstrated empirically. Typically such evidence might be of the form: "Mean percentage of ITQs read in Unit = 58%; Mean helpfulness rating = 3.21 (1 = not at all helpful, 5 = very helpful); Correlation between individual students mean helpfulness ratings and CMA grades for this Unit = -.007 (not significant, n = 2.850).

There was no difference between male and female students. Students aged 35-45 in Region 09 found the ITQs not very helpful significantly more often than students with no credit exemptions in Region 03 (Z test, p .05)." Obviously this is something of a parody, but we have all seen binfulls of such data. One of its most important characteristics is that it does not lead to an increased understanding of how to write your next ITQs.

In contrast, the value of ITQs would be examined in quite a different way from a 2nd order perspective.

Both the approach students take to reading texts and the outcome of their learning as described in qualitative terms has been shown to vary as a function of the nature of various forms of content oriented guidance. Whether or not students used ITQs might be seen to depend on their conception of the reading task and of learning in general. Whether or not those who used the ITQs found them helpful might be seen to depend on the students' goals and whether using the ITQ helped them to achieve these goals. Whether or not the insertion of ITQs influenced learning outcomes would be examined by looking at exactly what had been learned. It might be found that because the ITQs influenced students' approach to reading, in that a surface approach was encouraged, this therefore influenced the learning outcome and that incomplete understanding resulted from this surface approach. This level of understanding might be perfectly adequate for the quantitatively-based assessment system, however. So students who were primarily concerned to pass the course would find such ITQs helpful. There might also be students whose conception of learning was such that even though they were not primarily concerned to pass the course they were unable to recognise that the ITQs were orienting them towards an approach which resulted in an incomplete understanding. These students might consider the ITQs very helpful even though they resulted in qualitatively poorer learning outcomes! It hardly needs pointing out that none of this could be seen from a 1st order perspective. The recent debate concerning the construction of helpfulness rating scales seems somewhat irrelevant in the light of the likely variation in orientation, process and learning outcome amongst our students. Until we understand this variation, as students experience it, we will be in a very poor position to give advice on the use of

ITQs, however much survey data, collected from a 1st order perspective, we have.

> "In order to improve learning, we have to find out the different ways in which the students think about the content, on one hand, and to raise their consciousness of the way they set about the learning task, on the other."
>
> Ference Marton (1979)

Footnote 1

Parallels have been drawn in the literature (e.g. Ford, 1979) between Craik and Lockhart's "levels of processing" approach to the study of memory and Marton's descriptions of levels of processing. This is a misconceived parallel. All the processing Marton describes would be at the deepest level of Craik and Lockhart's hierarchy of levels. What Marton has described is a qualitative variation within what cognitive psychologists call the semantic, or deep level, domain of processing.

Footnote 2

We would like to make an additional distinction here between what Marton is proposing and the currently popular emphasis on 'knowledge structuring'. There has been something of a concensus that understanding the way knowledge in a particular area is structured is a vital prerequisite for teaching. There has also sometimes been an implicit assumption that such a knowledge is sufficient - that the way to teach a subject somehow flows directly from such knowledge. We would like to point out that studies, such as the economics study reported above, demonstrate that without an understanding of the way students think about the subject area such idealised knowledge structures may not be very useful.

References

Bartlett, F.C. (1932) "Remembering". Cambridge: The University Press.

Biggs, J.B. (1976) "Dimensions of study behaviour: another look at A.T.I." Br. J. Educ. Psychol., 46, 68-80.

Colaizzi, P.F. (1973) Reflection and research in psychology: A phenomenological study of learning. Dubuque: Kendall/Hunt.

Dahlgren, L.O. (1975) Qualitative differences in learning as a function of content oriented guidance. Acta Universitatis Gothoburgensis. PH.D. Thesis.

Dahlgren, L.O. (1978a) Effects of University Education on the conception of reality. Reports from the Institute of Education, University of Göteborg, No.65, May 1978.

Dahlgren, L.O. (1978c) Qualitative differences in conceptions of basic principles in Economics - a contribution to the discussion of the validity of examination results. Lancaster 4th International Conference on Higher Education, 1978.

Dahlgren, L.O. (1979a) Understanding students understanding - some qualitative aspects of the process and outcome of teaching and learning at University level. Reports from the Institute of Education, University of Göteborg, No.80, January 1979.

Dahlgren, L.O. (1976) Children's conception of price as a function of questions asked. Reports from the Institute of Education, University of Göteborg, No.81, March 1979.

Donaldson, M. (1978) — Children's minds. Fontana.

Ebbinghaus, M. (1885) — Uber das Gedachtnis. Leipzig: Dunker & Humbolt.

Edfeldt, A.E. (1976) — Är det meningsfullt med studieteknisk träning? (Is there a meaningful study-skill training?) Forskning am utbildring 3, 15-24.

Field, J. (1979) — "Advice and Preparation for New Undergraduates". Survey Research Department Paper 170, Institute of Educational Technology, Open University.

Ford, N. (1979) — Study Strategies, Orientations and 'Personal Meaningfulness' in Higher Education. British Journal of Educational Technology, No.2, Vol.10, pp.143-160.

Gibbs, G. (1977a) — "Can students be taught how to study?" Higher Education Bulletin, Vol. 5, No.2, pp.107-111.

Gibbs, G. (1977b) — Learning to Study - A Guide to Running Group Sessions. Institute of Educational Technology, Open University.

Goldman, R.D. (1972) — Effects of logical versus a mnemonic learning strategy on performance in two undergraduate psychology classes. Journal of Educational Psychology, 63, pp.347-352.

Hounsell, D. (1979) — Learning to learn - a critical introduction to the work of Graham Gibbs and Andrew Northedge. EARDHE Congress. Klagenfort, January 1979.

Laurillard, D. (1978) — The process of student learning. Lancaster 4th International Conference on Higher Education.

Laurillard, D. (1979) — Research methods in student learning. EARDHE Congress. Klagenfort, January 1979.

Marton, F. (1975a) — What does it take to learn? in 'How Students Learn', Eds. Entwistle and Hounsell.

Marton, F. (1965b) — On non-verbatim learning: II. The erosion effect of a task induced learning algorithm. Reports from the Institute of Education, University of Göteborg, No.40.

Marton, F. (1978) — Describing conceptions of the world around us. Reports from the Institute of Education, University of Göteborg, No.66. August 1978.

Marton, F. (1979) — Learning as seen from the learner's point of view. Ziff Papiere 30. Report Fern Universität.

Marton, F. and Saljo, R. (1976a) — On qualitative differences in learning: I - Outcome and process. Br. J. Educ. Psychol., 46, 4-11.

Marton F, and Saljo, R. (1976b) — On qualitative differences in learning: II - Outcome as a function of the learner's conception of the task. Br. J. Educ. Psychol., 46, 115-127.

Marton, F. and Svensson, L. (1979) — Conceptions of research in student learning. Higher Education, 8, 471-486.

Marton F. and Wenestam, C.G. (1979) — Qualitative differences in the understanding and retention of the main point in some texts based on the principle-example structure. Unpublished.

Miller C.M.L. and Parlett, M.R. (1974)	Up to the mark: a study of the examination game. Society for Research into Higher Education: London.
Northedge, A. (1979)	"Some thoughts on the processes of teaching and learning". Unpublished internal paper. Institute of Educational Technology, Open University.
Perry, W.G. (1970)	Forms of Intellectual and Ethical Development in the College years: A Scheme. New York: Holt, Rinehart and Winston.
Ramsden, P. (1979)	Student learning in context - the relationship between student learning and perceptions of the academic environment. Lancaster 4th International Conference on Higher Education, 1978.
Säljö, R. (1978)	Learning about learning. Lancaster 4th International Conference on Higher Education, 1978.
Säljö, R. (1979a)	Learning in the learner's perspective I - some commonsense conceptions. Reports from the Institute of Education, University of Götebort, No.76, January 1979.
Säljö, R. (1979b)	Learning in the learner's perspective II - differences in awareness. Reports from the Institute of Education, University of Göteborg, No.77, January 1979.
Säljö, R. (1979c)	Learning in the Learner's perspective IV - considering one's own strategy. Reports from the Institute of Education, University of Göteborg, No.79, January 1979.
Snyder, B. (1971)	The hidden curriculum. MIT.
Stratton, N. (1979)	"Social Science CMAs. Guidance on Improving Questions". Student Assessment Research Group. Report No.12. Institute of Educational Technology, Open University.
Svensson, L. (1976)	Study Skill and Learning. Acta Universitätis Göthobergensis. Ph.D. Thesis.
Svensson, L. (1977)	On qualitative differences in learning: III - Study skill and learning. Br. J. Educ. Psychol., 47. 233-243.
Svensson, L. (1979)	The context-dependent meaning of learning. Reports from the Institute of Education. University of Göteborg, No.82, March 1979.
Witkin, M.A., Moore, C.A. Goodenough Dr. and Cox. P.W. (1977)	Field-dependent and independent cognitive styles and their educational implications. Rev. Ed. Res., 47, 1. p.1.